Exponential Technologies in Everyday Life

In this lesson, Pascal explains in detail what exponential technologies are already doing, how and where they can be felt concretely, having a direct influence on our lives. Through Swanson's Law, you will get a good understanding of future developments and the significance of exponential technologies.

Learning contents

- **Technologies become cheaper**
- **Swanson's Law**

Alright, let's look into a couple of examples

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where we see this exponential change in the real world.

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Here is one: DNA sequencing.

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So the art and act of us sequencing a full genome.

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The first time we did this for a human was part of the Human Genome Project.

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That took us seven years of effort, was completed in 1999,

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and cost us 2.7 billion dollars.

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It's a massive breakthrough for mankind.

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First time we took all of those 3.2 billion base pairs of a single human and decoded them.

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That price dropped quite dramatically.

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2007 it was only a 350,000 dollar effort and was the first time we did is commercially,

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and still it took a long time.

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Now today that price is a few hundred dollars.

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That's the steepest drop in price performance we've ever seen in any technology, bar none.

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We went from "a nation state can do this exactly once because it's so expensive"

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to "your doctor can prescribe this".

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And then when you start asking experts and you figure out: where does this go?

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Because it's a really important question to ask: where does it go in the future?

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They will tell you that the price of sequencing a human genome will go down to pennies.

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A friend of mine is joking about this and says: "Every time you flush your toilet,

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we will sequence your human genome to give you a full health report",

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because the water in the toilet is more expensive than sequencing your genome.

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And here's a couple of ideas how you can use this:

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A company we invested in at Singularity University is doing a blood test.

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It takes 20 minutes, costs less than 200 dollar,

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and what they can do is, they can find RNA which is a building block for DNA in your bloodstream,

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and what they found out is that there's twelve different types of cancer

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which shed this RNA into your bloodstream,

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and they can detect those cancers

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previous or prior to any other test on this planet, pre-stage one.

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If this works it's gonna change the world of cancer detection.

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Let me give you another example: solar energy.

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Today the world is mostly driven by fossil fuel, it's gas and oil and coal,

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for a good reason: Because it's cheap.

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You look at solar.

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Solar was really, really expensive.

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In the 1970s solar was about 80 dollars a kilowatt hour.

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To put this into perspective:

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cheap energy, the production cost of cheap energy today is about 30 cents a kilowatt hour.

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Ten years later, the price dropped to ten dollars two kilowatt hours,

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a whole new order of magnitude.

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2015, in the country where I came from, California,

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price dropped to 30 cents a kilowatt hour without subsidies.

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It's the same price as coal is today.

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A year later Dubai started producing energy in an 800 megawatt facility

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for three cents a kilowatt hour.

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There's experts who tell you that by 2040 energy,

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the actual electrons out of your power socket will be free.

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It's crazy.

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Here's another interesting part about this.

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If we were to cover just about one percent of the Saharan desert,

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one percent!

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That is enough to power the world's energy consumption as it stands today.

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Of course theoretically. That's wild!

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There's something called "Swanson's Law".

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Swanson's Law says that for every doubling in solar panels installed

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the price of solar drops by another 20 to 50 percent.

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That means energy soon will be free.

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Think about the self-driving car.

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If you look at the self-driving car,

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the core part of the self-driving car is a thing called Lidar.

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It's the eyes of the car.

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When we first built them over at Google,

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Lidar was about 75.000 dollars and the size of the roof of the car.

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Today that price is about five to eight thousand dollars and it's the size of a football.

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And the next generation of Lidar is already here,

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it's just a couple hundred dollars, the size of an orange,

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and we can see this in the lab already.

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Lidar will be about a dollar and the size of a grain of rice.

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Make no mistake: electric cars are coming!

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They increase in capacity, the batteries increase in capacity which gives you more range.

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Meaning that you can easily drive 250 miles with your car today.

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They only have 80 moving parts in their engine and they accelerate nicer.

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There's so many reasons why these cars are the future.

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And that's the future man, the future is exponential.
